

Which Treatment do Parents Prefer?:
A Randomized Preference Trial to Inform Personalization of a Parent Training
Program

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Dedication

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Abstract

Studies on personalized interventions suggest that the ‘one size fits all’ approach of most psychotherapeutic interventions fails to meet the needs of many healthcare consumers. Because parents ultimately decide upon treatment for their children, there is a growing recognition that parents should be involved in the selection of their children’s mental health treatments. The goal of this pilot study is to investigate the relationships among parent preference, treatment attendance, treatment modality, and parenting treatment outcomes using a doubly randomized preference trial. At baseline, 129 families with children ages 4 to 12 years presenting at community mental health clinics participated in a conduct problems intervention study. Families consenting to participate in the study were randomly assigned to preference ($n = 64$) or non-preference groups ($n = 64$). Those in the choice group were able to choose between four intervention options while families in the no-choice group were randomly assigned to one of those four options. The results of Study 1 showed that individual family home-based Parent Management Training Oregon Model (PMTO) was the most preferred treatment and parents who were randomized to the choice group were more likely to attend the interventions than parents in the no-choice group. Using data from baseline, post-intervention and 6-month follow-up, in Study 2, the results of mixed-effects models showed that parents in the choice group who selected PMTO interventions had better parental treatment outcomes over time compared to parents in the choice group who selected child therapy. Implications were discussed.

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Introduction

Conduct problems are the most common source of mental health referrals in pediatric settings (Briggs-Gowan, Horwitz, Schwab-Stone, Leventhal, & Leaf, 2000); they also bring significant risks for later substance use and delinquency (SAMHSA, 2005). Evidence-based parenting programs are effective interventions for child conduct problems and for preventing youth substance use (Forgatch & DeGarmo, 1999; Haggerty, Skinner, MacKenzie, & Catalano, 2007). However, it is not unusual for half of a sample to drop out of parenting programs without completing the treatment (Prinz & Miller, 1994; Kazdin, 1990). Many parents from high-risk families (e.g., low socioeconomic status) who can potentially benefit the most from the parenting training often show limited treatment attendance and completion (Dumas & Wahler, 1983; Kazdin, 1990). The high attrition rates are especially salient among the sample of low-income families of color. For example, the attendance rate was only 33% for 441 African American families who were recruited to participate in a study of the effectiveness of a parent program that was adapted for African American families (Myer, Taylor, Alvy, Arrington, & Richardson, 1992). Low attendance is positively associated with poor treatment outcomes (Kazdin, Mazurick, & Siegel, 1994). Low attendance and retention in interventions for child conduct problems significantly threaten the effectiveness of treatment, which enhances the likelihood of children developing problematic behaviors. Despite the fact that recruitment and retention are low, randomized controlled trial data has shed little light on how to improve family attendance (Prinz et al., 2001; Staudt, 2007).

Choosing to attend a family intervention/prevention program is a decision making process. Poor alignment between parent preference and intervention programs received

may be one of the reasons for the low attendance and retention (Kazdin, 1996; Nock & Kazdin, 2001). Numerous treatment studies have revealed large individual variations in families' preferences for treatment (Cunningham et al., 2008, 2009, 2013). However, most evidence-based parenting interventions for conduct problems deliver exactly the same intervention to all families, regardless of families' preferences for treatment. Indeed, a mismatch between preferred and actual treatment was found to be related to demoralization, low attendance rates and poor therapeutic relationships (Kwan, Dimidjian, & Rizvi, 2010; Iacoviello et al., 2007; Torgerson & Sibbald, 1998).

There has been a growing recognition that parents should be involved in the selection of their children's mental health services (Cunningham et al., 2008; Hoagwood, 2005). In children's mental health services, parents ultimately consent and decide upon treatment for their children. Parental involvement in planning decisions ensures that services reflect the values of parents rather than only those of professionals (Vick & Scott, 1998) and help families and professionals reduce logistical barriers. Moreover, because parental goals may differ from those of professionals (Cunningham et al., 2007), parents may be more likely to benefit from service formats that meet their goals.

It is important to involve patients in the design of health and mental health services (APA, 2006; NIH, 2008, 2015). In January 2015, President Obama announced the Precision Medicine Initiative (PMI) that aims to deliver personalized treatment (<https://www.whitehouse.gov/the-press-office/2015/01/30/fact-sheet-president-obama-s-precision-medicine-initiative>). Precision medicine engages patients in the decision-making process of their treatment, and delivers treatments that are tailored to specific characteristics of individuals. Research on adaptive interventions has pointed out the need

to assign different modalities, dosages, or sequences of interventions to individuals based on the heterogeneity that exists in their needs and responses to the intervention (Bierman, Nix, Maples, & Murphy, 2006). Involving parents in the selection of their children's mental health prevention interventions may improve both family attendance and engagement in treatment, thereby enhancing the health outcomes of children. The benefits of matching clients to their preferred treatment have been documented in a meta-analysis of 26 studies: those clients were half as likely to drop out of treatment compared to those clients who were not matched to their preferred treatment (Swift & Callahan, 2009).

Despite the potential benefits of taking account of parent preference, no empirical study has tested the role of parent preference in any family-based psychosocial prevention using a randomized control trial. So far, only a few empirical studies (e.g., Cunningham et al., 2013; Waschbusch et al., 2011; Wymbs et al., 2015) have examined the patterns of parent preference pertaining to their children's mental health treatment (e.g., obsessive-compulsive disorder, ADHD; Lewin, McGuire, Murphy, & Storch, 2014). None of them have used a randomized control trial to study the effect of offering parents treatment choices on treatment retention or child outcomes. Furthermore, in previous studies examining patient preference, a large majority of evaluations do not include rigorous methodology, randomization, or long-term follow up. The inconsistent findings of those studies may be partially due to those limitations. Lastly, previous literature concentrated primarily on medication treatments, with many fewer studies focused on family-based psychosocial interventions.

The current study is a pilot study funded through NIMH (P20 MH085987; PI of the P20: Dr. Gerald August; PI of the pilot study: Dr. Abigail Gewirtz). The goal of this study is to discover whether addressing parent preference in intervention programs increases families' treatment attendance, ultimately improving treatment gains. The interventions included various modalities of Parent Management-Training Oregon model (PMTO) and child therapy. Based on social interaction learning theory, PMTO is a well-investigated evidence-based program that teaches parents to modify children's behaviors using effective parenting strategies (Forgatch, Patterson, & Gewirtz, 2013). It has shown efficacy in reducing child conduct problems, and increasing child social competence and school adjustment through improving parenting practices (Patterson, Forgatch, & DeGarmo, 2010). Child therapy refers to supportive psychotherapy provided to individual children in an outpatient setting.

Adaptive Interventions and Parent preference

Increasing focus has been on findings suggesting that the 'one size fits all' approach of most psychotherapeutic and mental health interventions fails to meet the needs of many healthcare consumers. Research on personalization/adaptive interventions has increased in recent years (Bierman et al., 2006; Collins, Murphy, & Bierman, 2004; Nahum-Shani et al., 2012). In contrast to traditional interventions in which every participant is given the same treatment, adaptive interventions assign different types or dosages of interventions to individuals in order to meet their diverse needs (Bierman et al., 2006). The term 'adaptive' refers also to the fact that treatments may be tailored to the participant both at the start of, and also during intervention. The potential benefits of adaptive interventions include reducing negative effects of intervention components that

are inappropriate for an individual, decreasing a waste of limited resources, increasing participants' compliance with treatment, and enhancing intervention potency (Collins et al., 2004).

Preference is defined as clients' desire for a certain therapy or therapist (Arnkoff et al., 2002; Glass, Arnkoff & Shaprio, 2001). Glass et al. (2001) in particular specified three types of preferences, including preferences for the role of clients and therapists, preferences for type of psychotherapy (e.g., psychotherapy vs. medication, or different psychotherapy approaches), and preferences for demographic characteristics of the therapist.

User participation in the design of health and mental health services is increasingly recommended as a matter of public policy (Cunningham et al., 2009). The National Institutes of Health (NIH) has prioritized attention to patients' participation as an important part of personalized interventions in their strategic plan (NIH, 2008). The American Psychological Association (APA) also emphasized the significance of maximizing the integration of patients' choice in the clinical decision-making process (APA, 2006).

Adaptive interventions have been applied to various mental health related areas: the treatment of depression (Rush et al., 2003), substance abuse (e.g., McKay, 2009; Murphy, Lynch, Oslin, McKay, & TenHave, 2007), and child and adolescent problem behaviors (e.g., Bierman et al., 2006; Connell, Dishion, Yasui, & Kavanagh, 2007). Much of this empirical literature focuses on titrating intervention dosage by participant need. Relatively less attention has been paid to participant preferences for intervention modalities, yet addressing preferences may remove a crucial barrier to poor treatment

outcomes: the low rates of participation and attendance in mental health interventions, which may lead to the improvement of treatment outcomes eventually. Nevertheless, no literature has addressed parent preference for children's mental health services. In addition, previous studies have yielded inconclusive findings concerning the effect of providing individuals treatment preferences on their treatment outcomes.

Incorporating preference-based models in intervention trials may be critical for increasing the treatment attendance of high-risk populations. The current study has focused on parent preference for a particular modality or type of therapy regarding children's conduct problems. It focuses on the associations of providing parents their preferred treatment modality with families' treatment attendance.

Methodology for Studying Preference Effect

Because the current study aims to use a doubly randomized preference trial to test the role of parent preference in a family-based intervention, the literature review in this section only includes robust empirical studies that use the randomized control trial as their research design.

A meta-analysis conducted by Swift, Callahan, and Vollmer (2011) indicated that research design (i.e., how participants are given choices) significantly moderated the effect of choice on the treatment outcomes. The largest outcome differences between choice condition and no-choice condition appeared in studies that randomized or assigned patients to a treatment, while the smallest outcome differences was found in partially randomized preference trials (PRPTs). Therefore, below, I review research designs for studying preference effect in previous literature.

Three types of RCTs are used prevalently in preference studies: traditional randomized controlled trials (RCTs), partially randomized preference (PRPT; Brewin & Bradley, 1989) and doubly randomized preference trials (DRPT; Long, Little, & Lin, 2008; Marcus, Stuart, Wang, Shadish, & Steiner, 2012), also known as parallel hybrid study designs (Abikoff, 2001). In traditional RCTs, patients are asked to indicate their preferences before they are randomized to a treatment either they choose or do not select. In the PRPT, patients with strong preferences are offered their treatment of choice, while those who agree with randomization are randomized as in any RCT. In the DRPT, patients are randomized into the choice condition and no-choice condition. Respondents in the choice condition are assigned to their preferred option while respondents in the no-choice condition are randomized to treatments.

In traditional RCTs, some patients happen to receive a treatment they prefer and others receive a treatment they do not prefer. Although considered the gold standard treatment study, traditional RCTs fail to consider that patients may drop-out if they have strong preferences, which lead to the potential consequence that only patients with weak preferences (i.e., receiving a non-preferred treatment is alright) remain in the study. Moreover, because patients are not randomized into choice condition, the study outcomes may lack internal validity when comparing choice condition and no-choice condition (Swift & Callahan, 2009).

Although PRPTs may be effective in including patients with strong preferences, the internal validity and the reliability of the treatment effects from PRPT are compromised by some uncontrolled confounding factors (Torgerson & Sibbald, 1998). For example, if one of the treatment modalities is strongly favored by participants, few

subjects will fall into the randomization condition. As a result, no clients receive a no-preferred treatment. Besides, individuals who do not indicate preferences may ascribe the undesirable treatment outcomes to their lack of motivation for change (Corrigan & Salzer, 2003).

DRPTs have several strengths: they increase the external validity of randomized studies by controlling for setting, participants, and cohort effects, but also enable researchers to examine whether providing choices to patients has an impact on their attendance and outcomes, because patients are randomized into a choice condition (and actually receive the treatment they choose), or a no-choice condition (where they are randomized to one of the treatments without being given a choice). The two-stage design (randomization to choice/no-choice, followed by randomization within the no-choice condition) is the only design that can provide unbiased estimates of selection effects (i.e. mean difference in outcomes between the choice and random arms (possibly specific to treatments); and preference effect (the conditional benefit that an individual participant experiences from receiving the preferred versus the non-preferred treatment), as well as outcomes (i.e. the effects of treatment; Walter, Turner, Macaskill, McCaffery, & Irwig, 2012).

Parent Preference for Children's Mental Health Interventions

Several published studies have used discrete conjoint experiments (DCEs) to investigate parent preference concerning their children's mental health services for attention-deficit disorder, oppositional defiant disorder, conduct disorder, anxiety and depression (e.g., Cunningham et al., 2008, 2013; Waschbusch et al., 2011; Wymbs et al., 2015). DCEs were used to model the preferences of parents who chose hypothetical

treatments randomly generated by experimentally varying combinations of treatment attributes. Studies have revealed different patterns of parental preferences that were associated with parent characteristics. For example, some parents were only interested in the benefits of the treatment in making their treatment preference decisions while other parents were more concerned with the treatment modality (psychosocial versus medication; Waschbusch et al., 2011). Another subgroup of parents, who reported the highest level of depression in themselves and the most severe mental health symptoms in their child, tended to choose information services that did not include parent components (Cunningham et al., 2008; Wymbs et al., 2015). A recent study conducted by Wymbs et al. (2015) compared parent preference for individual parent training (PT) and group PT. They found that among 445 parents who sought mental health services for children with ADHD symptoms, the 58.7% who indicated a preference for individual PT were more information-oriented compared to the 19.4% of individuals who favored group PT and who were more solution-focused. Because these studies suggest that parents' preferences do vary, it is important to take parents' preferences into consideration of children's prevention program.

Preferences and Treatment Attendance

Some scholars have suggested that clients who receive their preferred treatment may be more likely to be engaged in and adhere to the treatment (Glass et al., 2001; TenHave, Coyne, Salzer, & Katz, 2003), and have greater satisfaction and motivation, thereby increasing the likelihood of positive outcomes (Deci, 1980). A recent meta-analysis of 26 studies found that clients who were matched to their preferred treatment

were half as likely to drop out of treatment compared to those clients who were not matched to their preferred treatment (Swift & Callahan, 2009).

For example, in a traditional RCT that compared two psychotherapies and pharmacotherapy in a placebo controlled trial for 106 adults with major depressive disorder, Kwan et al. (2010) examined the direct effect of preference on attendance. Participants reported their preferences among three conditions (i.e., pharmacotherapy, psychotherapy, and no preference) before they were randomized to one of the three treatment modalities (i.e., pharmacotherapy, psychotherapy or pill placebo). The results revealed that participants who were randomized to their preferred treatment had significantly lower chances of dropping out of treatment ($p = .01$), greater session attendance ($p = .007$), and higher patient-therapist alliance ($p = .02$) compared to those randomized to their non-preferred treatment. Furthermore, they found that the effect of preference on session attendance remained across treatment modalities ($p = .42$).

Study 1: Parent Preference and Family Attendance

Purpose of the Current Study

According to previous studies, there seems to be a solid relationship between choice and treatment attendance. However, this relationship has not been tested in family-based psychosocial interventions for treating child conduct problems. In previous studies, different study designs were used to measure preference effect. However, most of the studies utilized traditional RCTs and PRPTs and only a small number of studies adopted DRPTs. Moreover, the majority of previous studies concentrated on comparing pharmacotherapy and psychotherapy (e.g., cognitive therapy), and the treatment outcomes inclusively were limited to anxiety, depression and substance abuse. To my knowledge, no randomized control trial has been used to examine parent preference for their children's mental health problems.

The objective of the current study was to use the DRPT design, which overcomes the methodological limitations of the traditional RCTs and PRPTs, to investigate the relationship between parental choice and family treatment attendance. Furthermore, another goal was to identify the most preferred treatment modality in the choice group, which could help clinics to understand which modality may engage parents the most. In the present study, 129 families with children ages 4 to 12 years presenting at community mental health clinics joined a conduct problems intervention study at baseline, and were followed up at post-intervention and 6-months post-intervention.

To achieve the stated objective, I propose to address the following specific aims.

Aim 1: Determine the most preferred treatment modality in the choice group.

Because of lack of previous literature, no hypothesis was generated.

Aim 2: Explore the association between families' choice and treatment attendance.

Hypothesis 1: Families in the choice condition will be less likely to dropout than those in the no-choice condition controlling for family demographics and treatment modality.

Method

Research Design

This study adopted a doubly randomized preference trial. Figure 2 provides a consort diagram indicating flow of families to groups. Clinic referred families who met study inclusion criteria and consented to participate were randomized to one of the two conditions, the no-choice condition or the choice condition. Parents randomized to the no-choice condition were further randomized into one of the four treatment formats: (i) individual family home-based Parent Management-Training Oregon model (PMTO), (ii) individual, clinic-based PMTO, (iii) multi-family group version of PMTO, or (iv) supportive child psychotherapy (SAU). Parents randomized to a choice condition were provided their preferred treatment format. Data from three points of time were collected, including baseline (T1), post-intervention (T2), and 6 months post-intervention (T3). Only the baseline (T1) data and family treatment attendance data collected throughout the intervention were utilized in the current study.

Procedures

This project was implemented in Oakland county and the city of Detroit in the state of Michigan beginning in 2011 using a convenience sampling strategy. Families with children ages 4-12 years, who presented to three community mental health clinics for oppositional behaviors and conduct problems, were informed of the opportunity to

participate in an intervention study by the clinic intake staff as well as through recruitment flyers. A research coordinator contacted those who agreed to participate, informing families that their participation in the study was voluntary, and their children's treatment at the clinic would not be influenced by study participation. The research coordinators also provided a description of the study, including the purpose, timeline, assessment, and expected benefits and risks that may be generated by the participation. Parents who agreed to participate in the study signed a consent form. Figure 2 provides a flowchart for the recruitment process.

The University of Minnesota Institutional Review Board approved the protocol. For inclusion in the current study, families had to have at least one child between the ages of four and twelve living with them who presented with conduct problems or oppositional behaviors by the beginning of the study. Parents had to agree to randomization. In addition to children's age, other exclusion criteria included: (1) children with documented pervasive developmental disability; (2) parents who did not have legal custody of their children; (3) parents with acute psychotic or manic symptoms, acute substance dependence requiring detoxification, mental retardation or imminent danger to self or others; (4) parents with less than a fifth-grade comprehension level in English; (5) families had previously received treatment for child behavior problems; and (6) families were unwilling to be randomized.

Assessment technicians administered assessments at pre-intervention (T1), post-intervention (T2), and at 6 months post-intervention (T3). At each time point, parents were given a packet of pencil-and-paper questionnaires to complete and mail back. In the questionnaires, parents were asked to report the family demographics, their psychological

symptoms and their child's conduct problems. Only the baseline (T1) data and family treatment attendance data were utilized in the current study. Baseline data were gathered from parents through the mailed questionnaires, and treatment attendance data were collected from clinics. Parents were paid \$50 for in-home assessments at baseline and posttests.

Participants

At baseline, 191 eligible families were referred by clinics to the study. In total 134 families participated in the study, with approximately a 70% response rate, but five families were found to have previously received services from the clinic, which was against the exclusion criterion, and therefore were excluded from analyses, leaving a final sample of 129 families (see Table 1). Sample household yearly income ranged from zero to \$130,000 per year with a median of \$14,400. Three-quarters of parents reported annual household incomes below \$20,000. Parents were 21 to 64 years old ($M = 32.68$), and reported their race as 60.0% African American, 2.6% Hispanic, 30.4% White American, 0.9% Native American, 5.2% multiracial and 0.9% other races. Approximately one-third (37.4%) of parents reported no college education and 49.6% parents had some college education; 12% parents had bachelor or masters degrees. Just 17.4% of children were reported to be living with two biological or adoptive parents, 48.7% of children lived with only single parents, and 20.9% children lived with one parent and parents' partner. Children's age ranged from 4 to 14 years ($M = 7.55$ years, with 64.3% boys and 35.7% girls, which is consistent with gender breakdowns for child mental health referrals.

Measures

The psychometric information of all the measures can be found in Table 2.

Demographics. Parents reported their gender, date of birth, education, ethnicity and annual household income (see Table 1). They also provided their children's gender, ethnicity, date of birth, and living arrangement (e.g., living with two biological parents).

Family treatment attendance. Family's attendance at each time point was measured in two ways: a) a dichotomous measure determining whether families completed or dropped from the treatment according to the facilitators. The criteria for completion are that a) families have finished the skill encouragement and limit setting components of PMTO; and b) attended at least 12 sessions of child therapy or the number of treatment sessions each family has completed.

Treatment modalities. Four intervention options were included in the current study. All except one treatment utilized PMTO: (i) individual family home-based PMTO, (ii) individual, clinic-based PMTO, and (iii) group, clinic-based multi-family version of PMTO. The fourth option was supportive child therapy (SAU). Fifteen therapists were trained in PMTO and provided PMTO across the various modalities in the current study. Child therapists were providers at the clinics, with licenses in different areas (psychology, social work or marriage and family therapy).

PMTO is an intervention which teaches parents to monitor, and respond to children's behaviors through behavior modification strategies based on social interaction learning theory (Forgatch, Patterson, Degarmo, & Beldavs, 2009). Parent training aims to teach positive parenting techniques and reduce negative parenting practices. The individual format sessions last for 60 minutes, and the group format sessions last for 90 minutes; both are provided on a weekly basis. Individual treatment may last for 3 – 9 months while group treatment includes 14 sessions. Each session consists of a warm-up

activity, brief review of last week's homework, introduction of new topics, practice of new skills and ends with new homework. For the group format, in general, 6-10 parents attend each group.

PMTO includes five main components: skill encouragement, limit setting, monitoring, problem solving and positive involvement. Skill encouragement refers to the use of scaffolding and positive reinforcement. Scaffolding teaches parents to break a difficult goal into specific steps by providing positive encouragement. Limit setting is a useful tool to constrain disruptive behaviors by giving consequences to undesirable behaviors. Monitoring involves parents keeping track of their children's behaviors at home and away from home. Problem solving is a skill that encourages parents to identify a problem and develop strategies to solve the problem. Positive involvement emphasizes that parents should show love and warmth when they interact with children (Forgatch et al., 2009).

Families assigned to, or selecting services-as-usual were treated by therapists trained in modalities other than PMTO. Treatment typically was non-directive child psychotherapy (e.g. play therapy). Sessions lasted 45-60 minutes and continued until discharge.

Data Analysis

Given that this is a pilot feasibility study with small sample size, several descriptive data analyses for each aim were conducted.

Analysis for Aim 1. Frequency of enrollment, engagement rates (i.e., complete rates, number of attended treatment sessions), and the number of parents who chose each

treatment modality were calculated. Mean and standard deviation of all the measures in the choice condition and the no-choice condition were examined (see Table 3).

Analysis for Aim 2. Evidence-based treatments like PMTO typically are shorter (i.e. fewer sessions to completion) than supportive psychotherapy. Therefore, the number of PMTO sessions and service-as-usual sessions to completion of treatment were not identical. The dichotomous measure showing drop-out status was analyzed as a measure of treatment attendance, which was similar to Long et al. (2012). Aim 2 was addressed through hierarchical logistic regression, focused on whether families in the no-choice group had a higher likelihood of dropping out of the treatment than those in the choice group controlling for demographics, clinic/site (a categorical variable representing three clinical sites), and treatment modality. Missing data were observed for 30 of the 129 cases (23.3%); $n = 99$ were included in the analysis. The missing data (23%) were due to missing values in demographics (family income, parent age and ethnicity) from families who did not complete the demographics form. Because demographic information cannot be imputed, methods to impute missing values were not used in the study. A rule of thumb for determining minimum sample size for regression analysis is that the model includes at least 10 participants for each predictor (VanVoorhis & Morgan, 2007). In the analysis I included eight variables estimating 10 parameters with a total sample size of $n = 99$. For the first block, the demographic variables (i.e., gender of child, parent age, parent ethnicity, family income) and a categorical variable that represented three clinics were included. For the second block, treatment modality was added. In order to examine the unique contribution of choice, after controlling for the family demographics and treatment modality in the first two blocks, choice was added in the third block. I included

the interaction between choice and treatment modality as the fourth block in the initial model; however, because the interaction was not significant, the interaction term was removed from the final model; only three blocks remained in the final model. The Negalkerke R square and the Hosmer and Lemeshow Test were used to evaluate the power or goodness of fit of the logistical regression model. The higher the value of the Negalkerke R square, the better goodness of fit the model is. If the *p* value of Hosmer and Lemeshow Test is not significant, it suggests that the independent variables explain the dependent variable well. Statistical analyses were performed with SPSS 21.

Results

Descriptive Results (Aim 1)

Families were retained in the study regardless of participation in treatment; thus data are reported for the entire study sample of 129 families. Attrition from treatment was significant: almost two-thirds of the sample (65.9%) either did not attend treatment at all (25.6%), or attended at least once but dropped out of the treatment, or were discharged by the clinic due to no-shows (40.3%), all of which were considered as drop out. Just 34.1% of the sample completed treatment. Median number of PMTO sessions and service-as-usual (SAU) sessions across the entire sample was 3 ($M = 6.95$, mode = 0, range = 0 - 40) and 11.50 ($M = 13.91$, mode = 0, range = 0 – 52), respectively. Median number of PMTO sessions and service-as-usual (SAU) sessions within the participants who completed the treatment was 16.0 ($M = 18.45$, mode = 12, range = 0 - 40) and 19.50 ($M = 23.0$, mode = 18, range = 0 – 51), respectively.

The breakdown of preference by treatment modality, and average number of sessions completed by families in each modality can be found in Table 4. For Aim 1,

within the choice condition, the most preferred modality was home-based PMTO (40.7% of the choice group selected this option). There was no association between family demographics and parents' choices of treatment modality. Table 5 provides a breakdown of treatment modality by demographics for those assigned to the choice condition.

Results: Logistical Regression (Aim 2)

Hypothesis 1 was supported (see Table 6). In the first block, demographic variables (child gender, parent age, race, and family income) and clinic did not significantly predict treatment dropout ($\chi^2 = 5.74$, df = 6, $p = .45$). After adding service modality, the second block was statistically significant ($\chi^2 = 16.94$, df = 3, $p = .001$). The coefficient on the modality variable had a Wald statistic equal to 149 which was significant at the .01 level (df = 3). The Nagelkerke R square of the model increased from .08 to .28. Parents in the PMTO group and individual clinic modalities were more likely to drop out of treatment than parents in services-as-usual ($p = .001$; $p = .008$ respectively). Entering choice, the third block was statistically significant ($\chi^2 = 5.58$, df = 1, $p = .018$), and the overall model was significant ($p < .01$). Regarding model fit, the Nagelkerke R square increased to .33 (the final model explained 33% of the variance in drop out), and the Hosmer and Lemeshow Test was not significant, suggesting good fit with the data (Peng, Lee, & Ingersoll, 2002). Families randomized to the no-choice condition were more likely to drop out of treatment than families in the choice group ($p = .022$), regardless of service modality.

Discussion

Low engagement and retention in prevention and treatment interventions threaten the integrity and cost-effectiveness of services. At least one prior study has showed that

many children with psychopathology did not receive treatment, and among those who did, 20 to 80% dropped out of treatment prematurely (Masi et al., 2003). In our study, almost two thirds of families dropped out of treatment. Families either quit the treatment or were discharged by the clinic due to no shows. In order to follow the policies of managed care and meet the needs of other patients who are on the waitlist, clinics have to discharge patients if they do not show up consistently. Usually, if the patients miss three appointments in succession, they will be automatically discharged by the clinic. Although strategies (e.g. a phone call the day before the session, troubleshooting logistical barriers) may increase show-up rates (McKay, McCadam, & Gonzales, 1996), due to limited resources, most clinics do not use those methods to maintain patients in the treatment.

Participants in the current study faced many challenges and the stress of poverty, single parent households and mental health problems which may prevent them from prioritizing therapy attendance. It is not surprising that participation and retention in the treatment is very low. Even within the participants who chose the most popular treatment modality – i.e. home-based PMTO, more than half of them dropped out of the treatment. Our findings resonate with the literature showing average length of treatment in community mental health clinics is just three to four sessions (McKay, Harrison, Gonzales, Kim, & Quintana, 2002). Families of children with conduct problems are at increased risk for dropping out of treatment (Baruch, Vrouva, & Fearon, 2009), and low-income minority families engage even less in treatment due to no insurance coverage, multiple stressors, and lack of transportation and child care (Myer et al., 1992; Kazdin, 1990). It is a paradox that such populations may be in most need of mental health services but they have such high drop-out rates. Despite the fact that conducting research

that examines preferences in community settings is challenging for these very reasons and the treatment attendance is typically low, the current study provided a unique opportunity to explore the potential benefits of providing preferences for enhancing participant engagement among such high-risks populations.

Extensive research has validated randomized controlled trials as the gold standard to determine the effectiveness of various treatments. However, their limitations (i.e. ignoring the influence of patient preference) exist because some patients may not engage in a treatment that they do not prefer. Consistent with most of the previous literature, despite the significant barriers to receiving service and the very high attrition, the present study supports the benefits of providing parents treatment choices for their child's conduct problems for family treatment attendance. Specifically, using a DRPT, even with a small, underpowered sample, our data suggest that providing families with choices of intervention modality is associated with a lower likelihood of dropping out of treatment controlling for family demographics and treatment modality. Interestingly, although choice and treatment modality independently predicted the variances of treatment attendance, treatment modality did not moderate the relationship between choice and treatment attendance, which was also found in Kwan et al. (2010). It suggests that the effect of choice on treatment attendance does not depend on treatment modality. No matter whether parents (PMTO) or children (SAU) receive therapy, parents have primary responsibility for managing both their own and their children's treatment attendance (e.g., arrange transportation and child care, offer consent, and make payment). Providing parents their preferred intervention for treating their child's conduct problems alone may enhance their positive expectancies about the treatment, motivations, therapeutic

relationship and reduce logistical barriers, which contributes to the growth of attendance (Lindhiem, Bennett, Trentacosta, & McLear, 2014).

The clinical implication is that accommodating to parents' treatment preferences may be promising for increasing families' engagement in services to benefit children's mental health, particularly for ethnic minorities, low-income and high-risk populations. Because high treatment drop-out rate and low sense of personal control exists in those groups, it is extremely valuable to provide them opportunities to contribute to their children's treatment, which may enhance treatment gains for vulnerable children and prevent severe problems when they enter adolescence. It is also important to ensure viable equipoise options exist in mental health clinics. For example, when group and individual, home-based and clinic-based services are available, offering families the choice between these may increase their participation in services. Evidence-based practices are slowly being implemented on a wide scale in community settings, but relatively few clinics offer multiple options. In order to match family choices, clinics must have the resources to offer not simply one, but multiple formats and/or types of evidence-based practices. In the current study we were able to capitalize upon a natural laboratory because Michigan is one of the few states with widespread implementation of PMTO, and the only one to offer multiple formats of the intervention (see, e.g. Forgatch & Gewirtz, in press).

There are other key findings. Within the choice condition, the most preferred treatment modality was home-based PMTO. Home-based PMTO treatment is convenient, and saves families time and money although it is costly for clinics to provide such services. Therefore, it is reasonable that parents favor home-based PMTO over other

modalities given the average low household incomes of the current sample. However, family demographics (child and parent age, parent race, child gender, family income) were not associated with treatment selection within the choice group. Notably, the sample was highly skewed towards poverty. It is unknown whether home-based treatment would be this popular among a higher-income population, or a population with a broader range of income.

Regardless of the choice assignment condition, those in multi-family groups and clinic-based individual PMTO were more likely to drop out of treatment than families in home-based PMTO or child therapy. These data are preliminary and must be replicated with a larger sample. Interestingly, assignment to or selection of the SAU modality was not associated with higher dropout, even though that modality, too, was clinic-based. The completion rate in child therapy was even higher than individual family home-based PMTO. There are various reasons that may explain the relative low attendance in multi-family groups and clinic-based individual PMTO. For example, these two formats of PMTO may be too demanding for parents because evidence-based behavioral interventions tend to be much harder work than supportive child therapy, due to the focus on behavioral rehearsal (Nock & Ferriter, 2005). In addition, parents may perceive group format parent training as intrusive to their privacy which raises concerns for being judged by other parents in the group (Heinrich, 2006). However, home-based PMTO showed superior attendance to the clinic-based group format and clinic-based individual PMTO. These findings are consistent with other research showing improved attendance in home-based compared to office-based therapy (Slesnick & Prestopnick, 2004; Thompson, Bender, Windsor, & Flynn, 2009).

Limitations and Future Directions

A key limitation of this pilot study is the small sample size given the multiple cells. This may explain the relatively large odd ratios and confidence intervals observed in our results. Replication of this study using a larger sample is warranted to verify the findings. Moreover, the treatment equivalence between each of the modalities of PMTO and child therapy was unclear- there are not any comparative effectiveness data. Such a study is underway (Gewirtz, 2014).

It is important to note, however, that in this study, choices were offered without the help of a decision aid. An effective decision aid might, for example, gather data via targeted questions for parents that enable calculation of an algorithm to determine – for example - parents' beliefs about interventions, the child's behavior, and their motivation to participate in treatment, as well as parent preference for specific treatment features (Wymbs et al., 2015) to ensure that families are helped to select the treatments that match their profiles (beliefs, motivational cognitions, etc.). Providing a decision aid may result in different proportions of preferred treatments. For example, it may be that when informed about the lack of evidence for supportive child therapy for conduct problems, families would be more likely to select among the other, evidence-based options. (Of course, this is related to supply: clinics, in some cases, had fewer therapists to deliver PMTO, resulting in a waitlist for PMTO but not for child therapy).

Further research is needed to examine whether factors not examined here (in particular, personality, expectations about therapy, parental psychopathology, perceived severity of child problems, attitudes towards child problems, and parental locus of control) may distinguish families selecting one format or type of therapy over another. In

an adaptive intervention, those factors are considered as tailoring variables that determine the inclusion of intervention components and reflect participants' values. Discovering a tailoring variable allows adaptive interventions to determine what modalities, types, dosages, or sequences of interventions a participant is offered, which can serve as decision aids to inform patients' treatment choices. Examining these data with a larger sample would allow for the analysis of interaction effects – which could address the question of whether families may select preferred options that match their attitudes and expectations. Our pilot data can guide future research in preferences by establishing estimates of cell sizes in the preference group (i.e. the approximate balance of preference for each treatment). That is, our data indicated that while approximately 40% of families in the choice condition preferred home-based services, other options were equally represented among the remaining 60% of families (20% in each of the remaining three groups). Studies that investigate the relationship between giving choices and the parental and child treatment outcomes are needed given other research has shown associations between treatment attendance and better outcomes (Dowell & Ogles, 2010; Garland et al., 2013).

In conclusion, the results suggest that, despite being a complex and sometimes challenging undertaking, doubly randomized preference trials can be conducted in the context of community mental health. Offering parents choices may be both feasible and beneficial for increasing family engagement in services for children's mental health problems. These data pave the way for subsequent personalization studies aimed at tailoring treatment options to family preferences with the help of decision aids to promote informed choice (Barry & Edgman-Levitan, 2012).

Study 2: Preferences, Treatment Attendance and Treatment Outcomes

Expanding upon Study 1, Study 2 used longitudinal data to examine 1) the relationship between choice and changes in treatment outcomes, 2) the moderating effect of treatment modality in the relationship between choice and treatment outcomes, and 3) whether the relationship between choice and treatment outcomes is mediated by family attendance. Three waves of data were used to investigate these three aims.

This study concentrates on the influence of choice on changes in parenting outcomes. Patterson's social interaction learning theory suggests that the impact of stress and risks on maladaptive child outcomes are mediated through negative parenting practices (Granic, & Patterson, 2006). Negative parenting responses such as inconsistent and harsh discipline directly reinforce child's conduct problems (Patterson & Dishion, 1985; Patterson, Reid, & Dishion, 1992). The parenting outcomes are the primary interest of the present study because improved parenting practices are the key treatment outcomes of parent training programs that lead to reductions in child behavior problems (DeGarmo & Patterson, 2004; Forgatch & DeGarmo, 1999).

Parental efficacy is often evaluated as a proximal intervention outcome of parenting programs (Dumka, Gonzales, Wheeler, & Millsap, 2010; Jones & Prinz, 2005; Sofronoff & Farbotko, 2002). Parental efficacy reflects the degree to which parents feel confident about their influence or control of their child's behaviors. Low levels of parental efficacy were associated with multiple dimensions of parenting problems and child behavioral problems (Dumka et al., 2010; Gewirtz, DeGarmo, Plowman, August, & Realmuto, 2009; Sanders & Woolley, 2005). Another important measure for assessing parenting practices is direct observation of the parent-child interaction. Observed

parenting practices are usually considered the target of parent training interventions. In this study they were assessed using Family Interaction Tasks (FITs), which have demonstrated validity for the effectiveness of parent training intervention and the prediction of child adjustment (Forgatch & DeGarmo, 1999).

Preferences and Treatment Outcomes

The research related to the relationships between giving patients preferences and the clinical outcomes of treatment are mixed, even across studies that used the same research design. Some studies found that giving patient preference directly improved clinical outcomes (Kocsis et al., 2009; Marcus et al., 2012); various studies reported null findings (Chilvers et al., 2001; Dobscha, Corson, & Gerrity, 2007; Kwan et al., 2010; Raue, Schulberg, Heo, Klimstra, & Bruce, 2009); one study even found a negative association between giving preferences and treatment outcomes (Burke et al., 2008). Those inconsistent findings may be due to the limitations in research designs, different ways of measuring treatment outcomes (e.g., physical outcomes vs. psychological outcomes), and little attention to factors that may moderate or mediate this relationship (e.g., treatment modality and treatment attendance).

In a meta-analysis of 10 studies (three studies employed traditional RCTs, three studies utilized PRPT, and four studies used non-RCTs), Swift and Callahan (2009) indicated that clients who were matched to their preferred treatment had a 58% chance of showing improvement compared to those clients who were not matched to their preferred treatment (42% chance of showing improvement; Swift & Callahan, 2009). The overall effect size was small but significant, $r = .15$, $p < .001$, $CI.95 = [.09, .21]$. A recent meta-analysis of 34 studies claimed a modest positive relationship between clients who chose

or were offered their preferred treatment and clinical outcomes (Effect Size $d = .15$; $p < .0001$), compared to clients who did not participate in shared decision making (Lindhiem et al., 2014). In a study by King et al. (2005) who reviewed 32 randomized controlled patient preference studies including both the PRPT design and DRPT design. They concluded that differences in outcome between choice condition and no-choice condition were small and inconsistent in direction, which provided little evidence to support the benefits of offering choices to patients.

Studies using DRPT design also had mixed results pertaining to the effects of preference on treatment outcomes. A DRPT study that investigated the effect of allowing dietary choices on weight reduction among 207 patients did not find preference effect on the treatment outcomes (Yancy et al., 2015). In this study, the researchers offered decision aids for informing participants' decisions for treatment choices. A similar study even found greater weight loss at 18 months in the no-choice group than the choice group (provided the preferred diet) among 176 adults who were overweight (Burke et al., 2008). By contrast, a few DRPT studies found an effect of preference on treatment outcomes (Marcus et al., 2012; McCaffery et al., 2011; Clark et al., 2008). For example, in a study, introductory psychology students were randomized to either a no-choice group or a choice group for two treatments-vocabulary training versus mathematics training, and a significant small to moderate effect of preference was found on improving mathematics outcomes (Marcus et al., 2012). Clark et al. (2008) used DRPT to increase heart disease management in women and discovered that those who received their preferred treatment format had significantly better psychosocial functioning at 4 months ($p = .02$) and marginally higher levels of physical functioning at 12 months ($p = .07$). Because of these

inconsistent findings, the relationship between choice and treatment outcomes needs to be further investigated.

Mechanisms for Preferences and Treatment Outcomes

In recent years, there has been a surge of research focusing on the mechanism of preference effect on outcomes. Researchers have been interested in understanding how mental health professionals accommodate patient preferences influence clinical outcomes. Street, Elwyn, and Epstein (2012) proposed a model of client preferences and introduced two pathways (behavioral and psychological) to explain the effect of preferences on clinical outcomes. Client preferences may promote positive health outcomes through the mediating effect of treatment attendance. Clients who receive their preferred treatment may be more motivated to complete the treatment, thereby demonstrating treatment gains. Two medical intervention studies found preference yielded greater treatment attendance and clinical outcomes (Cvengros, Christensen, Cunningham, Hillis, & Kaboli, 2009; Wilson et al., 2010). However, the mediation effect of attendance was not examined in those studies. Only one study examined the indirect relationship among preferences, treatment attendance and clinical outcomes. In a traditional RCT study that compared two psychotherapies and pharmacotherapy in a placebo-controlled trial for 106 adults with major depressive disorder, Kwan et al. (2010) examined the indirect effect of choice on depression outcomes via attendance. Preference match did not have a direct effect on treatment outcome (i.e. depression) according to the results, but a significant indirect effect of choice on depression was found ($p = .003$), with 16% of the variance in depression reduction explained primarily by a direct effect of attendance.

Incorporating clients' preferences may enhance clients' autonomy, control, efficacy, satisfaction and therapeutic alliance, which may lead to outcome improvement. These psychological effects may not be related to treatment mechanism itself. For example, therapeutic alliance (Elkin et al., 1999; Iacoviello et al., 2007) and patient-therapist communication (Kumar et al., 2010) increased due to preference, which also improved treatment outcomes. Therapeutic alliance is a partnership and mutual collaboration developed between therapist and client reflected by agreements on therapeutic goals, consensus on the means to conduct therapy, and a bond between these two individuals (Horvath, Del Re, Flückiger, & Symonds, 2011). Therapeutic alliance has been widely recognized as a reliable predictor of therapy outcomes (Horvath et al., 2011; Martin, Garske, & Davis, 2000). Providing preference may promote a positive attitude towards treatment and a mutual understanding of the therapy process, which in turns strengthens therapeutic alliance.

Street et al. (2012) suggested that treatment effectiveness may moderate the relationship between preference and clinical outcomes. Providing clients with preferences may have little influence on clinical outcomes if the treatment itself is not beneficial even though it may increase treatment attendance or sense of autonomy and control (Lee & Lin, 2010). Studies examined the interaction between choice and treatment modality on treatment outcomes and found that the type of treatment moderated the relationship between treatment choice and outcomes (Clark et al., 2008; Chilvers et al., 2001; Hardy et al., 1995). Using a DRPT, Clark et al. (2008) found an interaction effect between choice and treatment modality such that a preference effect on treatment outcomes was more salient if participants chose the group intervention format over the self-directed

format. Similarly, in a study using the PRPT, patients who agreed with randomization were randomized into one of the modalities (i.e., antidepressants vs. counseling), while participants who refused randomization (preference group) were given a choice (Chilvers et al., 2001). Patients in the preference group who chose counseling demonstrated greater improvement than those who chose antidepressants. In contrast, Kwan et al. (2010) used multilevel modeling to test a three-way interaction between preference, treatment modality and time using a traditional RCT. In total, 106 participants with major depressive disorder reported their preferences among psychotherapy, antidepressant medication, or no preference before they were randomized into one of the treatment modalities. Although the effect of preference on reducing depression was more salient for individuals who preferred antidepressant medication than psychotherapy, the moderating effect of treatment modality was not statistically significant. The authors discussed the limitations of the traditional RCT and recommended replicating their study using DRPTs.

Because previous studies suggested the moderating effect of treatment modality or treatment effectiveness, it is important to understand the effectiveness of PMTO and SAU on treatment outcomes in the current study. Webster-Stratton and Hammond (1997) examined the effectiveness of parent training and child therapy on the improvement of observed parenting behaviors. They found that the observed parenting practices of parents who received parent training significantly improved compared to the control group whereas such effect was not found in parents whose children received child therapy. Parents who received parent training displayed more praise behaviors than parents of children who received child therapy, and this effect remained in the 1-year follow-up assessment. Another study also yielded similar results. Treatments that include

parent training as components yielded significant improvement in mothers' positive parenting for the experimental group but not the control group, whereas treatments without parent training components were not significantly different from the control group (Webster-Stratton, Reid, & Hammond, 2004). Those findings indicate that parent training is more effective in promoting positive parenting behaviors than child therapy (Asher, Parkhurst, Hymel, & Williams, 1990; Kendall, 1993). In this study, one hypothesis is that parenting practices would improve for parents in the choice condition who chose PMTO but not for parents who chose child therapy (Service-As-Usual, SAU). In another words, treatment modality is hypothesized to be a moderator in the relationship between choice and parenting outcomes.

Purpose of the Current Study

Previous literature suggests that the effects of choice on treatment outcomes are still uncertain. As previous studies suggested, treatment modality might play a moderating role in the relationships among choice, treatment attendance and treatment outcomes (Chilvers et al., 2001; Hardy et al., 1995). The current study aims to understand the relationship between choice and treatment outcomes, and the potential moderator and mediator accounting for the mechanism.

Three waves of data and an intent-to-treat approach were utilized in the current study to understand the relationship between choice and parental outcomes, the moderating effect of treatment modality in the relationship between choice and parental outcomes, and the indirect effect of family attendance in the relationship between choice and parental outcomes.

The following three *specific aims* were examined:

Aim 1: Determine the moderating effect of parents' choices in the changes in treatment outcomes over three time points (i.e., parental efficacy and observed parenting behaviors). Because of the mixed findings in the literature, no hypothesis was proposed.

Aim 2: Determine the moderating effect of treatment modality in the relationship between families' choice and changes in parental treatment outcomes (i.e., parental efficacy and observed parenting practices) over three time points (see Figure 3).

Hypothesis 1: Parents in the choice condition who selected PMTO will have greater improvement in changes in parental efficacy over three time points than parents in the choice condition who selected Service-As-Usual treatment (SAU) and parents in the no-choice condition who received PMTO.

Hypothesis 2: Parents in the choice condition who selected PMTO will have greater improvement in observed parenting behaviors from baseline to T3 than parents in the choice condition who selected Service-As-Usual treatment (SAU) and parents in the no-choice condition who received PMTO.

Aim 3: Examine the mediating effect of treatment attendance in the relationship between choice and changes in parental treatment outcomes from baseline to T3 (see Figure 4).

Hypothesis 3: Families' treatment attendance will mediate the relationship between choice and changes in parental efficacy from baseline to T3.

Hypothesis 4: Families' treatment attendance will mediate the relationship between choice and changes in observed parenting outcomes from baseline to T3.

Method

Research Design

This study adopted a longitudinal doubly randomized preference trial, which is also regarded as a parallel hybrid study design (Abikoff, 2010). The current study used the same research design as Study 1 (see page 12). Different from Study 1, data from three points of time were utilized in the current study, including pre-intervention (T1), post-intervention (T2), and 6 months post-intervention (T3). The longitudinal design helps to elucidate the long-term impact of preferences on treatment effectiveness.

Procedures

The procedures of data collection were the same as for Study 1 (see page 12-14). Assessment technicians administered assessments at pre-intervention (T1), post-intervention (T2), and at 6 months post-intervention (T3). For families who received PMTO, their post-intervention assessment was initiated once research staff received notification from the clinic that they had completed PMTO. For families who received child therapy, their post-intervention assessment was initiated 9 months from their baseline assessment date. For all families, their 6 month post-intervention assessments were initiated 6 months after their post-intervention assessment. For families who dropped out of treatment while remaining in the study, their T2 data were collected after they dropped out. Following the informed consent process, at each point of time, parents were scheduled to do a 45-minute in-home assessment. Both the parents and children were asked to participate in family interaction tasks. Parents were also given a packet of pencil-and-paper questionnaires to complete and mail back. In the questionnaires, parents were asked to report the family demographics and perceptions about parental efficacy.

Parents were paid \$50 for in-home assessments at baseline and posttests. Children were given a small gift valued at \$5.

Participants

In total, 129 families participated in the study at T1. The demographic information about the families at T1 was reported in Study 1 at page 14. All the measures except family interaction tasks were reported by parents. Families remained in the study were either those who completed the treatment or those who dropped out of treatment but agreed to continue to be assessed in the study. At post-intervention assessment (T2), 86 families remained in the study. At six-month follow-up assessment (T3), 80 families remained in the study. No statistical differences in demographics were found for parents who stayed in the study and parents who dropped out the study.

Measures

Questionnaires were filled out by parents, and family interaction tasks were assessed during parent-child interaction at home. The measures include demographics, family attendance and engagement, treatment modalities, parental psychological symptoms, parental locus of control and family interaction tasks. The first three measures were described in study 1 at page 15-16. The psychometric information of all measures was presented in Table 2.

The Brief Symptom Inventory-18. The Brief Symptom Inventory-18 (BSI-18; Derogatis & Savitz, 2000) is an 18-item well-validated self-report measure of anxiety, depression, and somatization (each is a separate scale) that occurred over the past week. A global severity index of overall psychological distress was calculated by summing the

three scales. Higher scores on the BSI-18 scales suggest greater severity of symptoms.

Parents were asked to report their own psychological symptoms using BSI-18.

Parental Locus of Control Scale. Parental Locus of Control Scale (PLOC; Campis, Lyman, & Prentice-Dunn, 1986) is a 47-item questionnaire assessing parental control as it relates to parenting role and parent-child interactions. This measure consists of five subscales, including parental efficacy, parent responsibility, child control of parent life, parent belief in fate/chance, and parent control of child's behavior. Items were rated on a 5-point Likert-style scale, ranging from "Strongly Disagree" to "Strongly Agree". Only the mean of the total score of five subscales were used in the data analyses. Higher scores on the scale indicate that parents feel unable to control their child's behavior. Campis et al. (1986) reported evidence for good internal consistency, construct validity, and discriminant validity. For Aim 3, a discrepancy score of PLOC was computed by subtracting the total score of PLOC at T1 from T3, which represented the growth of parental efficacy over the three time points.

Family Interaction Task. Parents and children participated in videotaped Family Interaction Tasks (FITs) that consisted of seven independent tasks lasting 45 minutes in total. Tasks included playing three games (i.e., guessing games, Tangoes, Labryrinth), two 5-minute problem-solving tasks in which parents and child attempted to resolve current conflicts (Capaldi & Patterson, 1989; Prinz, Foster, Kent, & O'Leary, 1979), a 5-minute safety issues task in which parents were asked to pick a safety issue and talk to the child about it (Gewirtz et al., 2009) and a 5-minute monitoring task (Dishion, Nelson, & Kavanagh, 2003; Dishion & Patterson, 2006) during which the child was asked to talk with parents about a time in the last month when they spent time with friends without

adult supervision. Following each videotaped assessment, families were debriefed to address any concerns they may have. Parent-child interactions were scored using Coder Impressions (Forgatch, Knutson, & Mayne, 1992). Coding ratings of these tasks have strong reliability (e.g., Cronbach alphas ranging from .74-.92 and interrater reliabilities in the 70% range) and validity in measuring parenting practices that predict child and parent adjustment outcomes in both the short- and long-term (DeGarmo, Patterson, Forgatch, 2004; Forgatch et al., 2009; Gewirtz, DeGarmo, Lee, Morrell, & August, 2015). The rating of these tasks produced two main constructs: positive parenting (family problem-solving, skill encouragement, positive involvement, monitoring), and coercive parenting (inept discipline/non-contingent parenting). Problem-solving items included solution quality, extent of resolution, and likelihood of follow through. Positive involvement items included warm, empathy, encouragement and affectionate. Breaking the task into manageable steps, reinforcing success, and prompting appropriate behavior were examples of skill encouragement items. Inept discipline items included being overly strict, authoritarian, oppressive, erratic, inconsistent, and haphazard. For Aim 3, a discrepancy score of FITs was computed by subtracting the total score of observed parenting at T1 from T3, which represented the growth of observed parenting behaviors over the three time points.

Data Analysis

Data Analysis for Aim 1. Analyses were conducted using an intent-to-treat approach, with all the participants from baseline to T3 analyzed regardless of intervention attendance. To address Aim 1, linear mixed effects modeling was utilized to examine the relationship between families' choice and changes in parental treatment outcomes over

three time points using Stata 14.0 (Stata Corp, College Station, Texas). Given there are three times of measurement in the current study, mixed-effects modeling was ideal for examining between-subject differences while accounting for shared variance within subjects due to the repeated measures. Mixed effects modeling assumes that observations measured from the same participant are dependent, and therefore the regression coefficients vary across participants and are considered to be random. Furthermore, this approach allows estimation of fixed effect parameters including parental psychological symptoms, choice, time, and the two-way interactions among choice and time, and the random effects of changing values of repeated measures within each subject over time. Other advantages are the use of all the information available from each subject (i.e. maximum likelihood) even if some participants have missing observations given there are many missing values from T2 and T3.

A null linear mixed-effects model was tested (i.e., model the dependent variables without independent variables) and the random effects in both intercept and slope to examine the within-subject variation of observed parenting behaviors. The intra-class correlation coefficient at the subject level was .66 for parental efficacy and .38 for observed parenting behaviors respectively, indicating a moderate to high correlation between parenting outcomes in the same subject over three time points. Furthermore, I checked for normality and homogeneity. The parental efficacy and observed parenting behaviors at all three time points were normally distributed, with skewness = 0.98 and kurtosis = 0.45 for parental efficacy and skewness = 0.003 and kurtosis = 0.06 in observed parenting. Because two parenting outcomes (parental efficacy and observed parenting behaviors) were analyzed as dependent variables separately, two linear mixed-

effects models were utilized to investigate the relationship between families' choice and changes in parental treatment outcomes.

Specifically, two random coefficient models and two random intercept models were conducted for two parenting outcomes (i.e., parental efficacy and observed parenting behaviors). After comparison, random coefficient models were chosen instead of random intercept models. First, the results of model fit statistics including Akaike information criterion (AIC), and Bayesian information criterion (BIC) yielded similar model fit between random coefficient models and random intercept models (the difference was less than 10). AIC and BIC are two powerful model selection procedures for the linear mixed effects models derived from a model's likelihood function (Fang, 2011). The model with the lowest AIC or BIC is desirable. Second, according to the graph of subjects, there seemed to be changes in parenting outcomes over time within each participant, which suggests that the random effects in slope may be needed.

Robust evidence showed a negative association between parental psychopathology and parenting behaviors (Bailey, Hill, Oesterle, & Hawkins, 2009; Caughy, Huang, & Lima, 2009) and parenting interventions were less effective for parents with psychological symptoms such as depression (Van der Hoofdakker et al., 2010; see also a meta-analysis of Reyno & McGrath, 2006). Therefore, parental psychological symptoms were controlled for in both models.

As fixed effects, I entered parental psychological symptoms, choice, time, and the two-way interactions between choice and time into each model. As random effects, I had random intercepts for subjects, as well as random slopes for time. I used restricted maximum likelihood methods, which enabled analyzing the full, incomplete dataset by

using the data of each available case to compute maximum likelihood estimates (Kenward & Roger, 1997). Statistical analyses were performed with Stata 14.0 (Stata Corporation, College Station, Texas).

Data Analysis for Aim 2. Similarly to Aim 1, linear mixed-effects modeling was utilized to examine the moderating effect of treatment modality in the relationship between families' choice and changes in parental treatment outcomes over three time points using Stata 14.0 (Stata Corporation, College Station, Texas).

The raw mean score for observed parenting behaviors in each modality and choice group was presented in Table 7. Mixed-effect models were performed with restricted maximum likelihood method. Statistical analyses were performed with Stata 14.0 (Stata Corporation, College Station, Texas). The three-way interaction among choice, modality and time was the primary interest in the models because it reveals whether there was a difference in parenting outcomes over time between the choice group and the no-choice group when participants selected different treatment modalities. To understand the moderating effect of treatment modality, its conditional effect (i.e., its coefficients at the value of 0 for the other variable) and related interaction terms ("choice X modality", "choice X time", and "time X modality") were included in the model (Gill, 2001).

As fixed effects, I entered parental psychological symptoms, choice, modality, time, and the two-way interactions and three-way interactions among choice, modality and time into each model. As random effects, random intercepts for subjects as well as random slopes for time were used.

Data Analysis for Aim 3. Because missing data existed for parental efficacy and observed parenting at baseline, T2 and T3, the Missing Value Analysis (MVA) module

(SPSS 21) was used to simply impute missing data of parental efficacy and the observed parenting behaviors over three time point. MVA module investigates missing data patterns and imputes missing values through a maximum likelihood method based on expectation-maximization algorithms (Little & Rubin, 1987). The random residual imputation process ran for 50 iterations to minimize the differences between covariance matrices. Based on the variance t-test and crosstabulation of categorical variables table, there is no significant difference between respondents and non-respondents. The second step included using multiple regression analyses to investigate the proposed mediation model using SPSS 21 (see Figure 4).

To examine the mediating effect of family retention in the relationship between choice and changes in parental treatment outcomes from baseline to T3, first, a change score (T3-T1) was computed for parental efficacy and observed parenting respectively by subtracting the T3 score from baseline score. Second, the participants who received child therapy were excluded because the primary treatment outcomes of interest were parenting outcomes. Therefore, 96 participants who received PMTO remained in the data analysis. Third, correlational analyses were utilized to explore the relationships among choice, parental efficacy, observed parenting behaviors, number of PMTO sessions completed, and the dichotomous variable that indicated whether families complete or drop out of the treatment. Lastly, mediation analyses were implemented to test the mediation effect of number of PMTO sessions on the relationship between receipt of choice and changes in parental outcomes from baseline to T3, the discrepancy score. Because the number of PMTO sessions is a continuous variable, it is used to represent family attendance as the mediator, rather than the dichotomous variable that simply indicates the completion status

(complete versus drop-out). Changes in parental efficacy and the changes in observed parenting behaviors served as the dependent variable in two separate mediation models. Number of PMTO session was entered as the proposed mediator, and choice was entered as the independent variable. The baseline score of parental efficacy and observed parenting behaviors were entered as covariates respectively in two models. Bootstrapping was used to test the indirect effect with bias corrected confidence estimates (Mackinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004). Bootstrapping is a non-parametric method that uses resampling with many times of replacement. From each of these samples the indirect effect is computed and a sampling distribution is generated. A confidence interval is then estimated. If zero is not included in the interval, an indirect effect can be inferred (Bollen & Stine, 1990; Shrout & Bolger, 2002).

Results

Results of Aim 1

The results for the fixed-effects of the two random coefficient models are presented in Table 8. No interaction among time and choice was found in predicting changes in parental efficacy and observed parenting behaviors over time in either model. Choice did not contribute to changes in parental efficacy and observed parenting behaviors over three time points.

Results of Aim 2

The results for the fixed-effects of the two random coefficient models are presented in Table 9. A three-way interaction among modality, time and choice was found in predicting changes in parental efficacy and observed parenting behaviors over time in both models. Because higher scores on the parental efficacy scale indicate that

parents feel unable to control their child's behavior, the results suggested that a moderating effect of treatment modality was detected in the relationship between choice and improvement in parental efficacy and observed parenting behaviors over three time points. Families in the choice group who selected parenting intervention modalities (PMTO) had greater improvement in parental efficacy and observed parenting behaviors over the three time points than families in the choice group who selected child therapy (SAU). Hypothesis 1 and Hypothesis 2 were both supported.

To further understand the three-way interaction effect, the raw means of observed parenting behaviors at each time point were calculated for both participants in the choice and no-choice group respectively. It was found that in the choice group, participants who selected PMTO had significant greater improvement in observed parenting behaviors ($M = 2.34, SD = .44$) than those who selected child therapy ($M = 1.79, SD = .51$) at T3, $p = .003$, CI = [-.89, -.20]; see graph 5). Cohen's d was 0.48, demonstrating a medium effect. In contrast, in the no-choice group, there was no significant difference in changes in observed parenting behaviors over three time points between participants who were randomized to PMTO ($M = 14, SD = 0.65$) and child therapy ($M = 2.35, SD = 0.32$), $p = .35$, CI = [-.25, .67]. No significant difference was found in the comparison of raw means of parental efficacy at T3 between parents in the choice condition who chose PMTO and those who chose SAU.

Results of Aim 3

The results for the correlational analyses are presented in Table 10. Within the parents who received PMTO, parents who were in the choice group reported greater improvement in parental efficacy ($M = -1.95, SD = 15.22$) than parents who were in the

no-choice group ($M = -8.60$, $SD = 12.86$), $F = 1.28$, $p = .008$. Number of PMTO sessions was significantly positively related to the families' completion of treatment ($r = .77$, $p = .000$). No other significant findings were detected.

Based on the mediation regression analysis (see Figure 4), the results predicting changes in parental efficacy showed that the a-path (choice to number of PMTO sessions) was significant ($b = .82$, $SE = .38$, $p = .03$), and the b-path (the direct effect of number of PMTO sessions on parental efficacy) was not significant ($b = -.13$, $SE = .76$, $p = .86$). The total effect (c path) and the direct effect (c' path) of choice on parental efficacy was approaching significance ($bs = 4.84$ and 4.95 , $ps = .06$ and $.06$). In the present study, the 95% confidence interval of the indirect effects was obtained with 1000 bootstrap samples (Preacher & Hayes, 2008). Results suggested no indirect effects of family retention for predicting parental efficacy, $\beta = -.11$, CI [-1.92, 1.19]. Approximately 25% of the variance in satisfaction was accounted for by the predictors ($R^2 = .25$)

The results in predicting changes in observed parenting behaviors showed that the a-path (choice to number of PMTO sessions) was significant ($b = .88$, $SE = .37$, $p = .02$), and the b-path (the direct effect of number of PMTO sessions on parenting behaviors) was not significant ($b = .03$, $SE = .03$, $p = .33$). The total effect (c path) and the direct effect (c' path) of choice on parental efficacy was not significant ($bs = .12$ and $.10$, $ps = .15$ and $.26$). Bootstrapping results suggested no indirect effects of family retention for predicting observed parenting behaviors, $\beta = .02$, CI [-.01, .09]. Approximately 14% of the variance in satisfaction was accounted for by the predictors ($R^2 = .14$). Thus, Hypothesis 3 and Hypothesis 4 were not supported.

Discussion

Compared to the passive role in the mental health intervention a decade ago, patients play a more active role and have greater decisional control today (Lindhiem et al., 2014). The current study is the first study that uses DRPT to investigate the longitudinal benefits of providing choices to families for improving the outcomes of a family-based psychosocial intervention program. This study aims to understand the relationship between preference and treatment outcomes, and explore the mechanism of this relationship. The results indicate that preference does not predict treatment outcomes; this relationship was moderated by treatment modality but not mediated by treatment attendance. Providing parents with their preferred treatment for their child's conduct problems was beneficial for the improvement in parenting treatment outcomes only for parents who chose PMTO.

The null finding for the effect of preference on treatment outcomes over time was consistent with many previous studies (Chilvers et al., 2001; Dobscha et al., 2007; King et al., 2005; Kwan et al., 2010; Raue et al., 2009; Sterling, Gottheil, Glassman, Weinstein, & Serota, 1997), and contrasts others (Burke et al., 2008; Kocsis et al., 2009; Lindhiem et al., 2014; Marcus et al., 2012). The contradictory results in the literature can be ascribed to the differences in experimental designs, clinical populations, treatment, treatment outcomes, and the objectivity of measurements (biological measures vs. self-report questionnaires). Furthermore, rather than a direct association, moderators and mediators such as treatment modality and treatment attendance and engagement may contribute to such a relationship given the complexity of these mechanism (Clark et. al., 2008; Street et al., 2012).

Despite the small sample size, a moderating effect was found – parents in the choice condition who selected PMTO had greater improvement in parental efficacy and observed parenting behaviors over three time points than parents in the choice condition who selected Service-As-Usual treatment (SAU). Treatment modality moderates the relationship between preference and treatment outcomes, which aligns with empirical findings on the existence of interaction between treatment modality and preferences for predicting treatment outcomes (Clark et. al., 2008; Chilvers et al., 2001). This finding suggests that preference effect may influence treatment outcomes only in particular treatment modality (PMTO). Two possible reasons can explain this moderating effect: because PMTO has empirical evidence to support its effectiveness but SAU does not, preference may only have an effect on treatment outcomes when the selected treatment is evidence-based. Alternatively, parents who chose PMTO may indicate a stronger motivation to change their parenting skills than parents who chose SAU, which may contribute to their improved engagement and outcomes.

The most comfortable or desirable treatment for parents may not be the treatment that is most effective. In the current study, in order to create more statistical power, treatment modality was categorized as PMTO and SAU by combining all the PMTO modalities into one category. Among the two modalities, PMTO is a widely implemented intervention that has showed robust effectiveness in improving parental efficacy and observed parenting practice (Dumka et al., 2010; Forgatch & DeGarmo, 1999; Jones & Prinz, 2005). On the contrary, little evidence is available to support the effectiveness of child therapy on parenting practices. Numerous studies have recorded the advantages of involving parents in the child's mental health treatment rather than providing child

therapy alone (Bratton, Ray, Rhine, & Jones, 2005; Mendlowitz et al., 1999; Nock & Kazdin, 2001). Moreover, parent training programs showed more effectiveness in improving parenting outcomes than child therapy (Asher et al., 1990; Kendall, 1993; Webster-Stratton & Hammond, 1997; Webster-Stratton et al., 2004). Despite evidences showing PMTO may be more effective in producing improvement in parenting outcomes than SAU, no information about treatment effectiveness was provided to parents prior to their selection (in the choice group). Therefore, parents may have chosen a treatment that they perceive as effective but in fact is not. This study reveals the limitation of completely allowing clients to decide their treatment, which excludes the role of professionals and eliminates the opportunity for mutual collaboration between therapist and client. The present findings suggest that providing parents with preferred treatment alone is not sufficient for improving treatment outcomes; parents must have a choice and also choose an evidence-based treatment that aligns with their needs to optimize their treatment outcomes. Otherwise, without an effective treatment, even when parents are offered the therapy they desire, it may not create therapeutic improvements in outcomes. This finding highlights the importance of providing parents psychoeducation to help them understand the effectiveness of various treatment modalities before they make a decision.

Furthermore, parents' choice may be related to their beliefs about the cause of their child's problems (Kazdin & Wassell, 1999). Studies showed that mothers who believed they were responsible for their child's problems were more likely to have better therapeutic outcome compared with mothers who ascribed the child's problems as internal to the child (Morrissey-Kane & Prinz, 1999; Watson, 1986). Parents who actually chose PMTO might demonstrate more commitment to participate in their child's

treatment and stronger motivation for change than those who chose SAU. When parents take such responsibility of changing their own parenting behaviors to help their child, their active engagement will likely benefit their treatment outcomes. Thus choosing an evidence-based intervention and displaying the commitment to be involved in treatment may be warranted in order for parent preference to affect treatment outcomes.

The moderating effect of treatment modality was found for both parental efficacy and observed parenting behaviors. It suggests that parents who chose PMTO showed improved confidence of their ability to control their child's behaviors as well as their actual observed parenting behaviors. Conceptually, parental efficacy can be considered as an antecedent, an outcome, a mediator, or a transactional factor for parenting effectiveness (Jones & Prinz, 2005). The current study examined parental efficacy as an outcome of parenting effectiveness based on previous literature (Dumka, Gonzales, Wheeler, & Millsap, 2010; Jones & Prinz, 2005; Sofronoff & Farbotko, 2002). However, parental efficacy can be considered as a specific domain of personal control (Jones & Prinz, 2005) and personal control was found to be a mediator between providing a choice and treatment effectiveness (Geers et al., 2013). Therefore, in future studies, parental efficacy should be also tested as a mediator between preference and observed parenting behaviors.

Previous findings provide evidence of the association between preference and treatment attendance (see Study 1) and the putative mediating role of treatment attendance (Kwan et al., 2010); nevertheless, treatment attendance did not mediate the relationship between choice and parental outcomes in the current study. In addition to treatment attendance, giving choice may impact treatment outcomes through increasing

personal control, sense of empowerment and autonomy, self-determination, and therapeutic alliance (Ariely & Norton, 2007; Geers et al., 2013; Lacoviello et al., 2007; Leotti, Lyengar, & Ochsner, 2010; Street et al., 2012). When clients are able to exercise control over their health care decisions, they are not merely the recipients of treatment but also agents of change. Individuals with a high desire for control who were provided a treatment choice had more treatment gains from a placebo treatment, and personal control was a mediator between providing a choice and treatment effectiveness (Geers et al., 2013). Lacoviello et al. (2007) found that treatment preferences increased the therapeutic alliance over time. Conversely, patients may feel disappointed and demoralized if they do not receive their preferred treatment, which may threaten the therapeutic alliance and ultimately treatment outcomes. However, no study has directly tested whether therapeutic alliance mediates the relationship between preference and outcomes.

Family treatment attendance was not related to parenting outcomes, which means greater number of PMTO sessions attended did not guarantee improvement in parental outcomes. Studies have revealed that the length of parent training or child therapy did not necessarily predict positive treatment outcomes (Reardon, Cukrowicz, Reeves, & Joiner, 2002; Schneider & Byrne, 1985). Furthermore, only treatment attendance was measured in the present study. It is likely that the level of parents' engagement in treatment (active contribution to the therapy process) may be a more important factor than treatment attendance that determines treatment outcomes. To my knowledge, no previous studies have examined the mediating effect of parent treatment engagement in the relationship between preference and outcomes. Contrary to previous studies (see a review, Nock &

Ferriter, 2005), neither parental psychological symptoms nor child symptoms were related to treatment attendance.

Overall, this study suggests that the relationship between parent preference and parenting treatment outcomes is complex and mediators and moderators may exist. Because the benefits of choice on treatment outcomes may depend on the effectiveness of treatment modality, perhaps clinics should provide parents with their preferred treatment and inform parents about the effectiveness of each treatment option. Decision aids have been found to be helpful for clients to make informed decision (Cunich et al., 2011; DuBenske, Gustafson, Shaw, & Cleary, 2010). For example, clinics can have a treatment benefit chart that lists all evidence-based treatment options (e.g., multiple formats of PMTO) and the expected benefits, risks, and the characteristics of populations who find it most beneficial (Beidas et al., 2014; Lindhiem, Kolko, & Cheng, 2012). Clinicians should solicit information from parents about their experiences and preferences, identify parents' needs and values, present information on all options, and collaborate with parents to determine a treatment plan for their child.

Families in the current study had many risk factors including poverty, single parent households and mental health problems. Providing treatment choices and offering them their preferred treatment may particularly increase their sense of autonomy and control, which eventually improve their treatment outcomes. The current study also demonstrates the feasibility of using doubly randomized preference trials to understand the effect of parent preference on parenting treatment outcomes in the family-based psychosocial interventions. It highlights the importance of offering choices to parents and

engaging them in the shared decision making process for their child's mental health services.

Limitations and Future Directions

The current study was limited by the small sample size given double randomization and the multiple cells, by virtue of the particular variables selected for the study, and the high attrition rate at T2 and T3. These data are preliminary and must be replicated with a larger sample. Furthermore, in this doubly randomized preference trial, only two treatment modalities (PMTO vs. SAU) were included in the mixed-effects models. PMTO showed more effectiveness in improving parenting outcomes than SAU, but the analyses failed to test whether different modalities within PMTO moderate the relationship between preference and treatment outcomes. Lastly, despite the fact that the high-risk sample allowed for an understanding of the role of giving choices for treatment outcomes, the high prevalence of poverty and single parenthood limits the generalizability of the findings to other populations.

Similar to other studies in the literature (e.g., Dunlop et al., 2012), another limitation of the present study is that parents in the choice group were not offered any decision support or psychoeducation for each treatment modality. Ideally, parent preference should be based on the understanding of a desirable treatment outcome. However, in reality, parents' choice may be based on many other factors especially when they are not provided with sufficient information about the services. For instance, some parents believe that they do not need to improve their parenting skills because they ascribe all the problems to their child only, and thus would select child therapy. If psychoeducation about the importance of parental involvement can be accessible to those

parents, they may consider receiving a parent training intervention. Providing decision aids may not only help parents to choose the best treatment for their child but also strengthen the therapeutic alliance by working together with therapist on therapeutic goals and approaches and creating a bond at the early phrase of therapy.

Future studies could test the effect of psychological factors such as sense of autonomy and satisfaction with care that was identified as psychological pathway in Street et al. (2012). Parents' perceived need for improving parenting behaviors, perceived severity of child problems, and their ascription of their child's problems (internal vs. external) should be examined as moderators of the effect of preference on clinical outcomes; parental efficacy, parents' sense of autonomy and control, treatment engagement, and therapeutic alliance should be investigated as mediators. Different modalities within PMTO should be examined in treatment modality. Furthermore, decision aids should be provided to parents in the choice group for making an informed decision (Burke et al., 2008; Yancy et al., 2015). Information about the associations between families' characteristics (e.g., demographics, psychopathology, and personal control) and treatment effectiveness should be offered to help parents choose the most appropriate treatment corresponding to their background and needs. In addition, a qualitative study needs to be conducted to identify individuals' rationale for choosing a certain treatment modality, and to explore how providing a preferred treatment might influence parents' motivations, treatment engagement and parenting outcomes.

To summarize, parent preference appears to have modest effects on parenting treatment outcomes for parents who chose PMTO longitudinally, which suggests treatment modality is an important moderator for studying the relationship between

preference and clinical outcomes. These findings highlight the clinical benefits of providing psychoeducation to inform parent preference when parents choose from two or more treatment options. Providing preference to parents should be a shared decision-making process that involves both parents and therapist.

Conclusion

Together, these two studies were the first attempt to investigate the role of providing client treatment preference in family-based psychosocial interventions. Due to the strengths of the methodology including research design (DRPT), longitudinal data collection, both subjective and objective measures, and real-world community sample, these studies expand the edge of knowledge, yield implications for clinical practice, and set the stage for future study.

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Table 1

Demographics of the Whole Sample at Baseline (N = 129)

Variables	M	SD
Parent Age	32.68	8.16
Parent Gender (female %)	97.8	
Single parent household (%)	48.7	
Family annual income (Median, \$)	14,400,00	20,064.27
Parent ethnicity (Black %)	60	
Parent education (college graduate %)	12.0	
Child age	7.55	2.38
Child gender (female %)	35.7	
Child ethnicity (Black %)	57.4	

Table 2

Psychometric Information of All Measures for Study 1 and Study 2

Measures	Scales and/or Domains Utilized	Scale Score	Sample questions
Demographics	Parents' gender, date of birth, education level, ethnicity and annual household income; children's gender, ethnicity, date of birth, and living arrangement		
Family Attendance	Completion status (complete VS. drop), number of sessions attended		
The Brief Symptom Inventory-18	Anxiety ($\alpha = .87$), depression ($\alpha = .84$), somatization ($\alpha = .85$), and global severity ($\alpha = .93$)	5-point scale from 0 to 4 (0 = <i>not at all</i> to 4= <i>extremely</i>)	"How much were you distressed by feeling lonely?"
Parental Locus of Control Scale	Parental efficacy ($\alpha = .72$), parental responsibility ($\alpha = .79$), child control ($\alpha = .63$), parental belief in fate/chance ($\alpha = .69$), parental control ($\alpha = .85$),	5-point Likert format from 1 to 5 (1 = <i>strongly disagree</i> to 5 = <i>strongly agree</i> .)	"If your child tantrums no matter what you try, you might as well give up"; "I feel like what happens in my life is mostly determined by my child."
Family Interaction Task	Problem solving, Monitoring, Skill Encouragement, Coercive Discipline.		

Table 3

Demographic and Clinical Characteristics of the Choice and No-Choice Conditions

Variables	Choice (n = 64)		No-Choice (n = 64)		<i>p</i>
	M or χ^2	SD	M or χ^2	SD	
Child Age	7.62	2.41	7.54	1.84	
Child Gender (male %)	68.7		58.2		
Child Ethnicity (Black %)	46.3		46.3		
Single parent household (%)	38.8		40.3		
Parent Ethnicity (Black %)	47.8		49.3		
Parent education (college graduate %)	11.9		9.0		
Parent age	32.56	9.28	32.94	6.83	
BSI18					
anxiety	5.06	4.78	6.68	6.79	.002
depression	5.38	5.06	6.39	5.36	.747
somatization	4.53	4.76	5.61	5.95	.026
global severity index	14.97	12.37	18.68	16.25	.007
PLOC					
Parental Belief in Fate	24.92	6.37	26.56	5.85	.138
Child control of parent's life	14.47	4.40	15.51	4.99	.218
Parental efficacy	19.72	6.62	20.21	6.17	.668
Parental control of child's behavior	28.55	8.84	27.89	8.09	.663
Parental responsibility	31.38	7.70	31.82	7.77	.750
Observation Parenting Practices (Mothers)					
Problem solving	2.44	.55	2.25	.62	.072
Harsh discipline	1.44	.37	1.44	.43	.941
Positive involvement	3.10	.37	2.89	.47	.009
Skill encouragement	2.76	.66	2.71	.57	.655
Monitoring	3.04	.83	3.13	.88	.568

Table 4

Frequencies of Participants who Completed Treatment and the Median Number of Sessions Attended by Treatment Modalities for Choice and No-choice Groups (N = 129)

Modality/Variable	Choice	No-Choice
	n=64	n=64
Group-based PMTO	n=13	n=17
# Completed	4	0
Median # sessions (range)	2.5 (0-15)	0 (0-3)
Home-based PMTO	n=24	n=16
# Completed	11	7
Median # sessions (range)	8.5 (0-40)	4 (0-20)
Clinic-based PMTO	n=13	n=13
# Completed	3	4
Median # sessions (range)	3 (0-22)	1 (0-35)
Child Therapy (SAU)	n=14	n=18
# Completed	9	6
Median # sessions (range)	18 (0-52)	7.5 (0-24)

Note. One family's modality information in the choice group was missing.

Table 5

Descriptives of Treatment Modality by Demographics in the Choice Group (N = 64)

Variable	Group-based PMTO	Home-based PMTO	Clinic-based PMTO	Child Therapy (SAU)
Parent race (African American%)	53.3%	35.0%	46.2%	68.8%
Parent age (M/SD)	33.26 (7.87)	33.03 (8.19)	32.82 (7.42)	32 (9.38)
Child age (M/SD)	7.22 (2.07)	7.75 (1.98)	7.55 (2.72)	7.77 (1.99)
Child Gender (male %)	63.30%	67.50%	53.80%	71.90%
Family Income (median \$)	11,500	16,200	10,824	11,964

Table 6

Summary of Logistic Regression Analysis Predicting Dropout: Full Model (n = 99)

Variable	B	SE	Wald	OR	95% CI
Clinic			4.77		
Clinic 1 (ES)	-.19	.88	4.77*	.15	.03-.82
Clinic 2 (S)	-.19	.81	2.84	.26	.05-1.25
Clinic 3 (CC) ^a	-.19	-	-	-	-
Child Gender (boys)	.33	.53	.39	.72	.25-2.04
Parent Race (African American)	.64	.57	1.26	.53	.17-1.61
Parent Age	-.02	.03	.68	.98	.93-1.04
Family Income	-.19	.60	2.81	.37	.11-1.19
No-Choice	1.14	.50	5.22*	3.12	1.18-8.29
Modality			13.51**		
PMTO Group	3.08	.92	11.32***	21.75	3.62-130.85
PMTO Clinic	2.36	.83	7.93**	10.54	2.05-54.22
PMTO Home	1.55	.81	3.64	4.71	.96-23.18
Child Therapy ^a	-.19	-	-	-	-

Note. ^a Clinic 3 (CC) and Child Therapy are the reference groups in each category.

OR=Odds Ratio; CI=Confidence Interval; *p<.05, **p<.01, ***p<.001.

Table 7

Summary of Observed Parenting Behaviors by Choice and Modality (raw score)

	Baseline (Time1)	Time2	Time3
Choice (PMTO)	2.23	2.43	2.34
Choice (SAU)	1.88	1.99	1.79
No-choice (PMTO)	2.14	2.20	2.14
No-choice (SAU)	2.08	2.37	2.35

Table 8

Summary of Fixed Effects from Two Random Coefficient Models: the Relationship between Choice and Parental Outcomes

Variable	Parental Efficacy Coefficient (SE)	Observed Parenting Coefficient (SE)
<i>Covariates</i>		
Psychological symptoms	.23 (.07) ***	-.00 (.00)
Time	-3.82 (1.28) **	.01 (.05)
Choice	-1.06 (3.29)	-.01 (.07)
Choice X Time	2.08 (1.75)	.05 (.06)
Df	8	8
Log restricted-likelihood	-1190.91	-165.05
AIC	2397.82	346.11
BIC	2427.10	375.10

Notes. **p < .01, ***p < .001.

Table 9

Summary of Fixed Effects from Two Random Coefficient Models: the Moderating Effect of Modality in the Relationship between Choice and Parental Outcomes

Variable	Parental Efficacy Coefficient (SE)	Observed Parenting Coefficient (SE)
<i>Covariates</i>		
Psychological symptoms	.25 (.07)***	-.00 (.00) +
Time	-3.60 (2.49)	.13 (.09)
Choice	-5.41 (6.67)	-.26 (.14) +
Modality (PMTO)	1.11 (5.19)	.03 (.11)
Time X Modality (PMTO)	-.19 (2.85)	-.16 (.10)
Choice X Time	7.99 (3.51)*	-.20 (.13)
Choice X Modality (PMTO)	6.42 (7.65)	.32 (.16)*
Choice X Time X Modality (PMTO)	-8.20 (4.03)*	.33 (.14)*
Df	12	12
Log restricted-likelihood	-1162.63	-159.04
AIC	2349.27	342.08
BIC	2393.06	385.43

Notes. + p < .10, *p < .05, ***p < .001.

Table 10

Correlations among parental outcomes, family attendance and choice among parents who received PMTO.

	1	2	3	4
1. Parental efficacy difference	-			
2. Observed parenting behaviors difference	-.03 (.777)	-		
3. Number of PMTO sessions	-.02 (.869)	.19 (.097) ⁺	-	
4. Completion status	-.02 (.861)	.09 (.291)	.77 (.000) ^{***}	-
5. Choice status	.23 (.008) ^{**}	.03 (.724)	.15 (.200)	.16 (.074) [*]

Notes. Pearson correlation coefficient (*p* value), ⁺*p* < .10, **p* < .05, ***p* < .01, ****p* < .001.

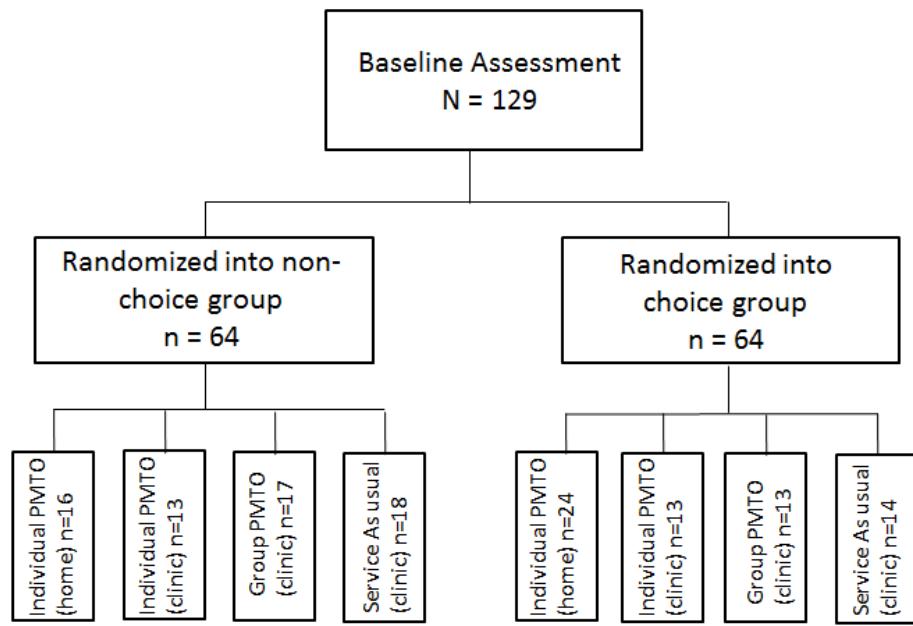


Figure 1. Consort diagram indicating flow of families to groups.
Note. One family's modality information in the choice group was missing.

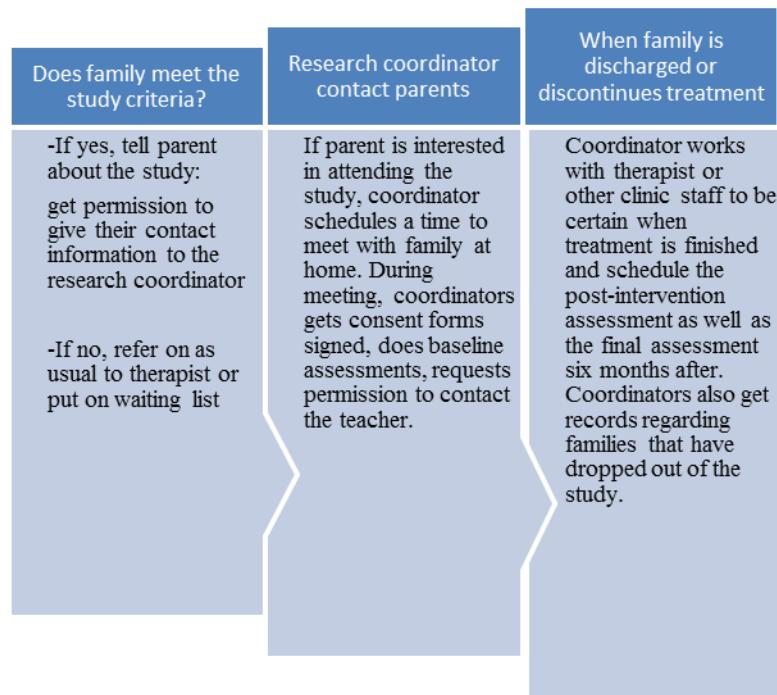


Figure 2. Flow chart for recruitment process.

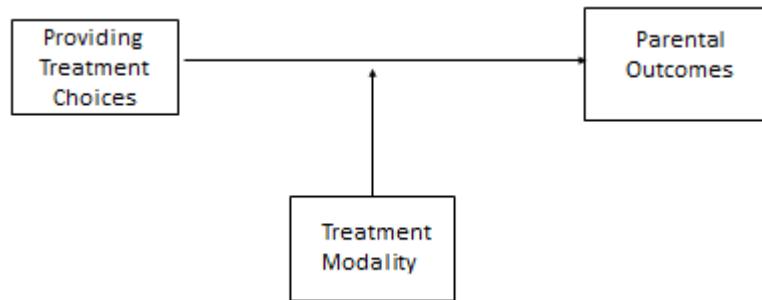


Figure 3. Moderating Effect of Treatment Modality in the relationship between choice and parental outcomes over time

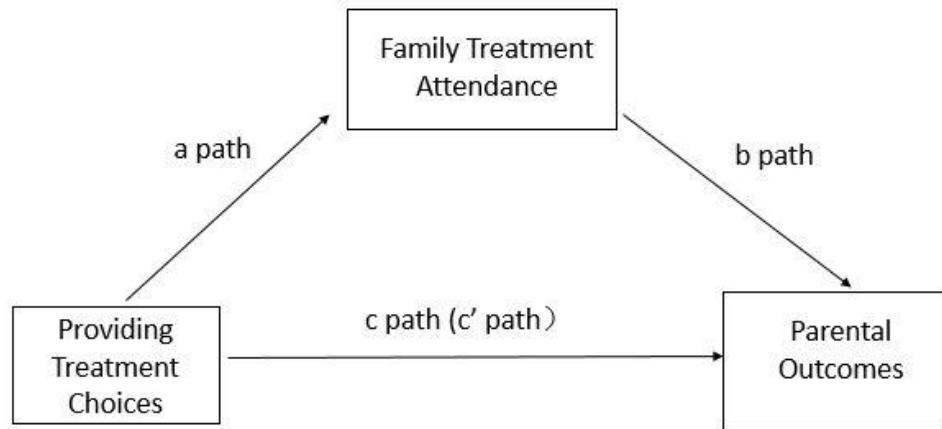


Figure 4. Mediating Effect of Treatment attendance in the relationship between choice and improvement in parental outcomes over time

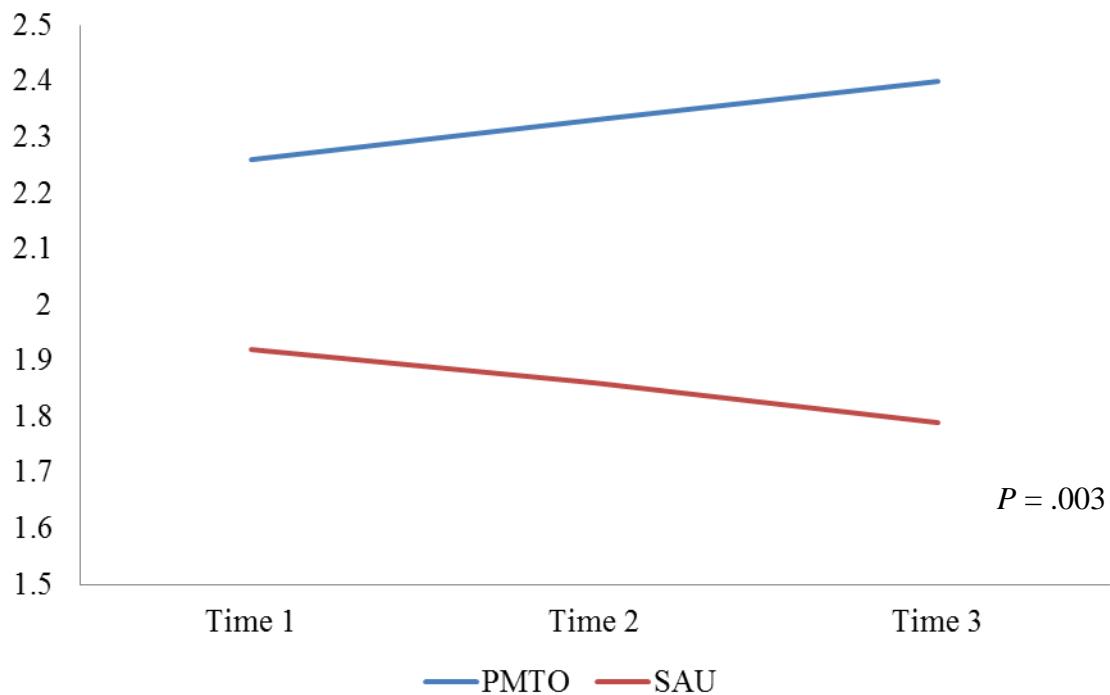


Figure 5. Means in observed parenting practice in PMTO and SAU treatment among the choice group